QUALITY CONTROL REPORTS FOR

SEMI DENSE BITUMINOUS CONCRETE

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Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.07/RSCN/QB(SDBC)/2014-15 16.06.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
NAME OF THE WORK	:	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	16.06.2014

The results of the tests conducted on the bitumen sample for Semi Dense Bituminous Concrete are as follows:

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	91	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	292	Min. 220

Note:

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Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	305	298	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.59	22.60	**22.10**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.06.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	384	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	297	297	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.86	22.66	22.76

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
Name of Work	: Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 16.06.2014

Result : Flakiness Index = **11.85%**

Elongation Index = **13.74%**

Result : Combined Flakiness & Elongation index **25.59%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
Name of Work	: Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 16.06.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.63%**

Elongation Index = **13.47%**

Result : Combined Flakiness & Elongation index **26.10%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/RSCN/SDBC/Stripping/2014-15 18.06.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
Name of the work	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.06.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.33	96.67
2	3.3		
3	3.5		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.07/RSCN/SDBC/Sp_Wa/2014-15 18.06.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	18.06.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2025	2028	2026	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1270	1273	1271	
4	Weight of saturated surface dry aggregate in air	W_3 g	2029	2028	2030	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	759	755	759	
6	Weight of oven dried aggregate	W_4 g	2015	2012	2017	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.655	2.665	2.657	2.659
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.705	2.723	2.704	2.710
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.69%	0.80%	0.64%	0.71%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.07/RSCN/SDBC/Bit/2014-15 18.06.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
NAME OF THE WORK	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
SAMPLE I/D	Roads in Kempapura Venkategowda Layout Ward No.07
DATE OF TESTING	18.06.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	25.50
7. Bitumen content in %	5.00	5.10
8. Average	**5.05**	

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Job No.: CTCE/BBMP/W.No.07/RSCN/SDBC/Bit/2014-15 18.06.2014

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
NAME OF THE WORK	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
SAMPLE I/D	Roads in Kempapura Venkategowda Layout Ward No.07
DATE OF TESTING	18.06.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	34.23	7.21	7.21	92.79	90-100
4.75	241.6	50.86	58.07	41.93	35-51
2.36	56.28	11.85	69.92	30.08	24-39
1.18	35.47	7.47	77.39	22.61	15-30
0.3	42.13	8.87	86.25	13.75	9-19
0.075	33.69	7.09	93.35	6.65	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.57	7.71	7.71	92.29	90-100
4.75	251.4	52.98	60.69	39.31	35-51
2.36	36.52	7.70	68.39	31.61	24-39
1.18	42.15	8.88	77.27	22.73	15-30
0.3	36.58	7.71	84.98	15.02	9-19
0.075	41.27	8.70	93.68	6.32	3-8

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Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ram Singh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvement to Roads, Drains and Asphalting to Roads in Venkategowda Layout Kempapura 1st Main in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/162/2013-14 Dated: 09.10.2013
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	18.06.2014

Total Weight of Sample: **5360** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	280	5.2	5.22	94.78	90-100	
4.75	2532	47.2	52.46	47.54	35-51	
2.36	845	15.8	68.23	31.77	24-39	
1.18	563	10.5	78.73	21.27	15-30	
0.3	487	9.1	87.82	12.18	9-19	
0.075	358	6.7	94.50	5.50	3-8	

Total Weight of Sample: **5230** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	295	5.6	5.64	94.36	90-100	
4.75	2614	50.0	55.62	44.38	35-51	
2.36	754	14.4	70.04	29.96	24-39	
1.18	523	10.0	80.04	19.96	15-30	
0.3	385	7.4	87.40	12.60	9-19	
0.075	362	6.9	94.32	5.68	3-8	

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